REMARKS

I. Introduction

Currently, claims 1-21 and 26-27 are pending. Claims 1 (article), 18 (method), 21 (article) and 26 (method) are the independent claims.

II. The Rejections

The Examiner rejected claims 1-12 and 14-25 as obvious under 35 U.S.C. §103(a) as obvious based upon U.S. Published Application No. 2003/0118237 to Laird (now U.S. Patent No. 7,154,531 to Laird) in view of USPN 6,737,970 to Wuestefeld.

The Examiner rejected claim 10 was rejected under 35 U.S.C. §103(a) as obvious based upon Laird and Wuestefeld and further in view of USPN 6,841,780 to Cofer.

III. The Advantage And Problem Solved By Applicants

Movable barrier operators that serve to control movement of movable barriers (including but not limited to garage doors of all types, gates, and shutters) have been well known and understood in the art. It is known to use infrared detectors installed at the sides of the barrier opening and aligned across a barrier opening area to detect intrusion into the area. One of the detectors, an IR source sends an IR beam to a receiver, or IR sensor aligned with the IR source located across the barrier opening. Upon sensing the absence of the IR at the sensor indicating of an obstacle, movement of the movable barrier can be altered. However, the function of the IR detectors is limited to detecting an interruption of the IR beam, and the detectors need precise alignment, which provide certain difficulties during their installation.

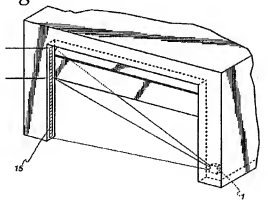
There is a need for a simple, inexpensive detection device which is fast acting, precise in what it "sees", is easy to install and which is able to sense intrusions and obstacles in a defined area as well as to provide detection of an obstruction without necessarily reference to a memory in the operator.

IV. The References

Laird

Laird describes a pattern which is on the side of a garage door. Laird uses a digital imaging device such as a CCD camera to view the pattern on the side wall. When an object enters the field of view, it interrupts the viewing of and obscures the recognizable pattern. The digital image device detects when this situation occurs and an alarm can be initiated. Laird, paragraph 11.

Fig. 2



Laird does not -

- describe a projection device which can project a line of light on a garage floor (Laird uses a bar code image on the side of the door opening);

- control a system without reference to memory, but rather Laird has to use a memory to detect whether there has been a change in the image on the side of the door being observed by the camera;

- have a beam projector;

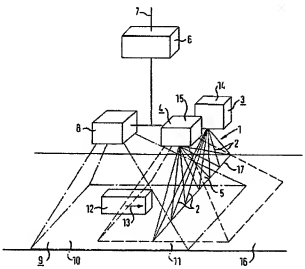
- project light line (or any projected image) on a floor have any light on a floor as part of a detection system (gluing an image to a garage floor for Laird's CCD camera to observe would not be practical); and

- project a beam from above and at an angle offset from the projected line of light and the barrier opening.

Wuestefeld

Wuestefeld describes a system which monitors a moving conveyor belt 16 by monitoring an area of the moving belt as well as a line. As seen in Figure 2 reproduced below, image detector 8 monitors two secondary areas 10 and 11 to determine if package 12 is permitted by an analysis by evaluation unit 6. See Wuestefeld at column 4, lines 55 to 67. If it is a permitted object, then the protection device 1 is deactivated. See Wuestefeld at column 5, lines 1-8. To increase the accuracy of the device, the package 12 again can be observed in area 5 with rays 2 which projected in a line from transmitter unit 3 and illumination unit 14. See Wuestefeld at column 4, lines 36-39 and column 5, lines 9-20. These units are mounted above and project beams to the moving belt 16. As can be seen, the system is not always "on" during movement of the conveyor, and indeed, the detection system is turned "off" if a permitted package is detected in the secondary area 10 while moving on belt 16. "The evaluation unit 6 compares the detected image of the line 17 with a pre-set reference image which corresponds to the profile of the line 17 with an object 12 not present." Wuestefeld at column 4, lines 40-44 and lines 65 et seq.

FIG. 2



Wuestefeld never says what he does with the recognition of the object observed with the line of rays 2. He only says this analysis is done to increase the accuracy of the device. He never says if the conveyor is stopped or if an alarm sounds or the package is diverted.

As can be seen from the above discussion and figure, Wuestefeld differs from the claims because –

- Wuestefeld does not stop movement of anything, but the image analysis describes turning the image detection device "off" and "on";

- applicants' device stops a movement of a barrier and the detection device is always on during the critical movement of closing the barrier so an obstruction can be detected;

- Wuestefeld relies upon a two step analysis which includes the observation of an area (e.g. 10) as well as a line with Wuestefeld not suggesting that the enhanced analysis by the line stops anything, including the conveyor; and

- Wuestefeld does a topographical analysis of the package and stops and starts his detection unit with his detection units and compares that analysis with what is stored in the memory of the system.

Cofer

The Examiner cited Cofer in rejecting claim 10 because Cofer describes the use of a laser diode. Cofer does not add to the Laird/Wuestefeld combination because Cofer does not describe detection of the interruption of a line of light projected onto a floor of a barrier at the barrier opening.

Cofer describes a system that detects the presence of objects in a monitored area as opposed to a line. One or more complex patterns of light are projected onto the monitored area. Changes in the complex patterns are detected in the monitored area and these changes indicate the presence of an object in the monitored area. See Cofer, Abstract.

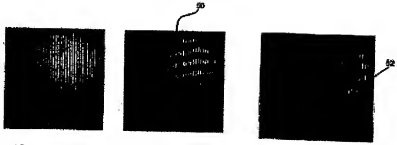


FIG. 5A FIG. 5B FIG. 5C

More specifically, Cofer teaches that a moiré interference pattern is projected onto the monitored area. The moiré interference pattern may be created in several ways. For example, two complex patterns of light may be projected onto the same area. Additionally, one pattern may be projected onto the monitored area while another may be imposed by a pattern grating positioned in the image plane of an image capture device. Further, two images of the same pattern in the same area may be captured and rotated. See Cofer at column 2, lines 1-39 and Cofer's FIGs. 5a-c reproduced below for the convenience of the Examiner. Cofer then compares the "live" image to a reference image in memory to determine whether an object exists. See FIG. 9 of Cofer.

V. No Reference Alone Or In Combination Renders The Claims Obvious

The determination of whether the line of light has changed without consulting a data structure produces (as described in claims 21 and 26) several advantages for the applicants' system. For example, removing the requirement to access a data structure in memory makes the applicants' system faster than approaches where a data structure is consulted since time is not needed to access the data structure. Further, the applicants' approaches reduce costs because a memory storage device to store reference patterns is not needed. Even if a memory storage device is still used, the applicants' approaches free substantial memory space because large reference patterns need not be stored. The applicants' approaches also reduce set-up and maintenance costs.

Moreover, monitoring whether an obstruction is detected by its interruption of a line of

projected light (as required by all of the claims) is fast and precise. As stated at page 5, lines 21 et seq of the specification:

> A sudden change of the grey level in a single point corresponds either to a point on the edge of an object or to any color or aspect variation of the acquired image. Detection of this change allows a precision measurement, due to the high resolution on the linear sensor, which is considerably better than the resolution of an area sensors. For instance, by using a backlight, the position of a strip can be easily detected.

As can be seen from the references, no reference alone or in combination suggest

- the projection of a line on a floor with a projection device which line is then observed for the detection of an interruption;

- the determination of an interruption without reference to data in a stored memory;

- the use of a projected line on a stationary floor to determine the interruption in the image of the line to stop a moving barrier; and

- the continuous projection of a light line during movement of the system without shutting the detection system or light line down.

VI. The Claims Are Supported By The Specification

The claims have been amended to recite sensing when an observed single substantially straight line changes in the presence of an obstruction without consulting a data structure stored in memory. Among other places, this amendment is supported at page 2, lines 30 35, page 6, lines 2-5 and 18-27.

The claims have also been amended to recite that the line of light is projected onto a floor at angles. Among other places, this is supported by FIGs. 1 and 3 of the specification and the related text at page 2, line 21. Projecting the light onto the ground is easier to accomplish as compared to projecting the light onto a moving surface (e.g., a moving door or conveyor belt).

VII. The References Should Not Be Combined, And Even If Combined Do Not Add Up To The Claims

All of the references rely on a reference to memory and all of the references rely on a detection system that monitors an area as opposed to a line of light. This is faster and cheaper

than monitoring areas and comparing the monitored area with data stored in a memory. Wuestefeld's system monitors a moving conveyor belt (not a stationary floor) and describes the projection of a line only in conjunction with monitoring an area. There is no practical motivation to combine Wuestefeld's projection system with Laird's camera monitoring non-projected image on the side of a door (not a floor as it would not be practical to apply an image to a floor and subject it to wear and tear) to detect an obstruction which interrupts the non-projected image to stop a moving door. Wuestefeld does not stop movement, but shuts a monitoring system off, so it really teaches away from what applicants claim, and indeed, Wuestefeld teaches away from combing it with Laird which does stop a door. There must have be a reason to combine or modify Laird with Wuestefeld to render applicant's claims obvious. There has been no meaningful articulated reason why applicant or a person of ordinary skill would have thought he had a prospect of success to monitor a projected line as described in the claims. *Ex parte Whalen*, 89 U.S.P.Q.2d 1078 (BPAI 2008); *Ex parte Alexander*, 86 U.S.P.Q. 2d 1120, 1123 (BPAI 2007). The Board in *Whalen* stated:

> The U.S. Supreme Court recently held that rigid and mandatory application of the "teaching-suggestion-motivation," or TSM, test is incompatible with its precedents. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 [82 USPQ2d 1385] (2007). The Court did not, however, discard the TSM test completely; it noted that its precedents show that an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.*
>
> The Court held that the TSM test must be applied flexibly, and take into account a number of factors "in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed." *Id.* at 1740-41. Despite this flexibility, however, the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the way the claimed new invention does." *Id.* "To facilitate review, this analysis should be made explicit." *Id.*
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> The KSR Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were

known in the prior art; it must be shown that those of ordinary skill in the art would have has some "apparent reason to combine the known elements in the fashion claimed." *Id.* at 1741.

In the same way, when the prior art teaches away from the claimed solution as presented here (FF12, FF20, FF22 and FF 24), obviousness cannot be proven merely by showing that a known composition could have been modified by routine experimentation or solely on the expectation of success; it must be shown that those of ordinary skill in the art would have had some apparent reason to modify the known composition in a way that would result in the claimed composition.

(Emphasis added.)

VIII. Conclusion

Based upon the foregoing amendments and remarks, it is submitted that the pending claims and application are in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees which may be required with respect to this communication, or credit any overpayment, to Deposit Account No. 06-1135.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

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